

Proposal for New Codes for Intracranial Monitoring and Catheter Insertions

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[Proposal]

- Issue:

- Current code 01.26 says insertion of catheter into cranial cavity. Code not specific enough
- Suggestion: Expand the ventriculostomy code 02.2 to identify sites of catheter insertion

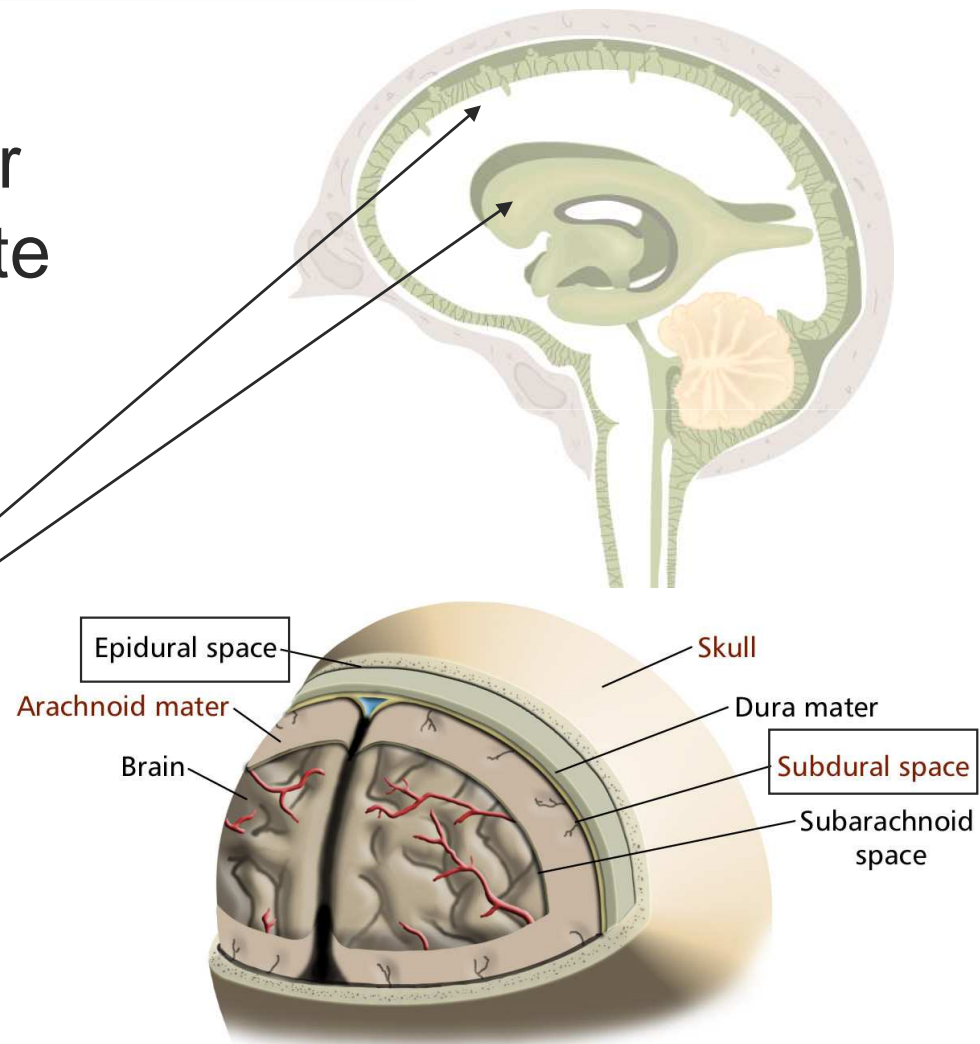
[Proposal]

- Rename category 02.2 Insertion of a catheter for Monitoring or Drainage of CSF (bolted or tunneled)
 - 02.20 Ventriculostomy
 - 02.21 Frontal Horn of Lateral Ventricle for monitoring
 - 02.22 Parenchyma
 - 02.23 Subdural Space
 - 02.24 Epidural Space

[Introduction]

■ Sites of Catheter Insertions (Delete Code 01.26)

- Parenchymal
- Ventricular
- Extradural (Subdural or epidural)



[Introduction]

- Also recommend creation of new category to identify parameter monitored. (01.18 unable to be expanded)
 - Intracranial pressure (ICP)
 - Partial pressure of brain oxygen (PbtO₂)
 - Brain temperature
 - Cerebral blood flow (CBF)
 - Brain metabolism (Microdialysis)

[Current Use]

- Current use of Neuro Monitoring
 - Neuro Trauma Patients
 - Cerebrovascular insults
 - Brain tumors
 - Others



[Purpose of Monitoring]

- Identify & prevent secondary injury caused by increased intracranial pressure and/or decreased brain oxygenation and cerebral blood flow
- Track the use of the technology, their impact on care and on patient outcomes

[Future Uses]

- Future of Neuro Monitoring
 - New technologies on the horizon
 - CBF
 - Microdialysis

[Technology of ICP]

■ Technology -ICP

- Fluid-filled external transducers
- Micro-tip transducers
- Fiberoptics
- Air-pouch



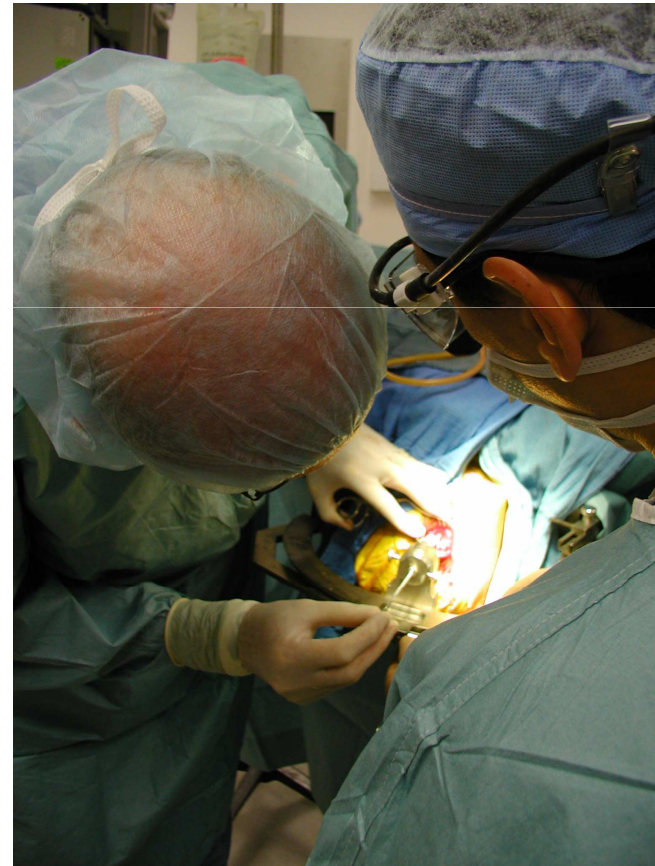
[Clinical Description]

- Brain tissue oxygen



[Clinical Description]

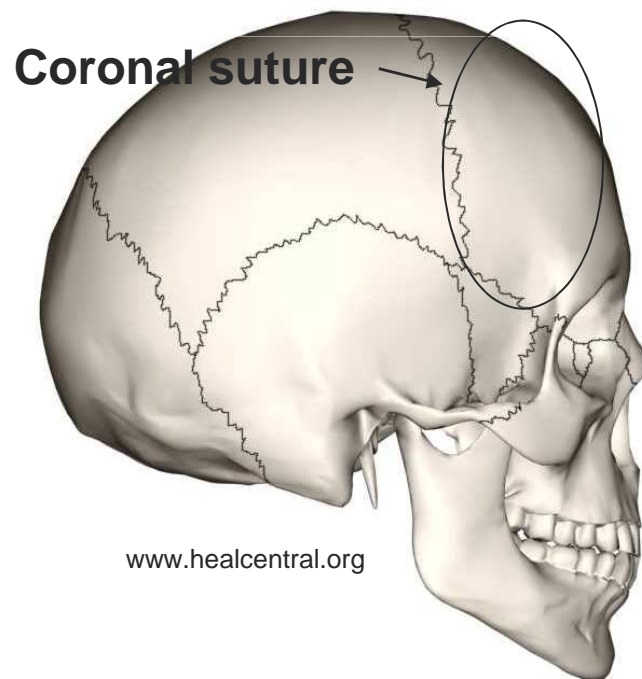
- May be performed in:
 - Operating room
 - Intensive Care
 - Emergency Department
- Sterile procedure



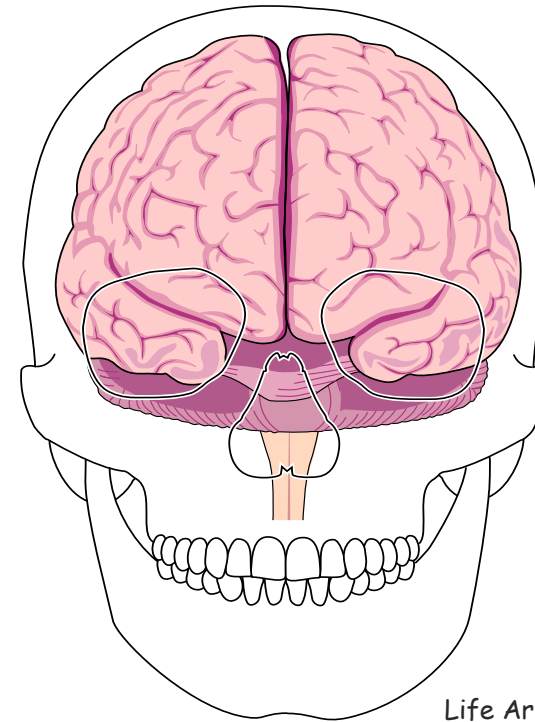
Clinical Description

■ Insertion

- Anterior to coronal suture

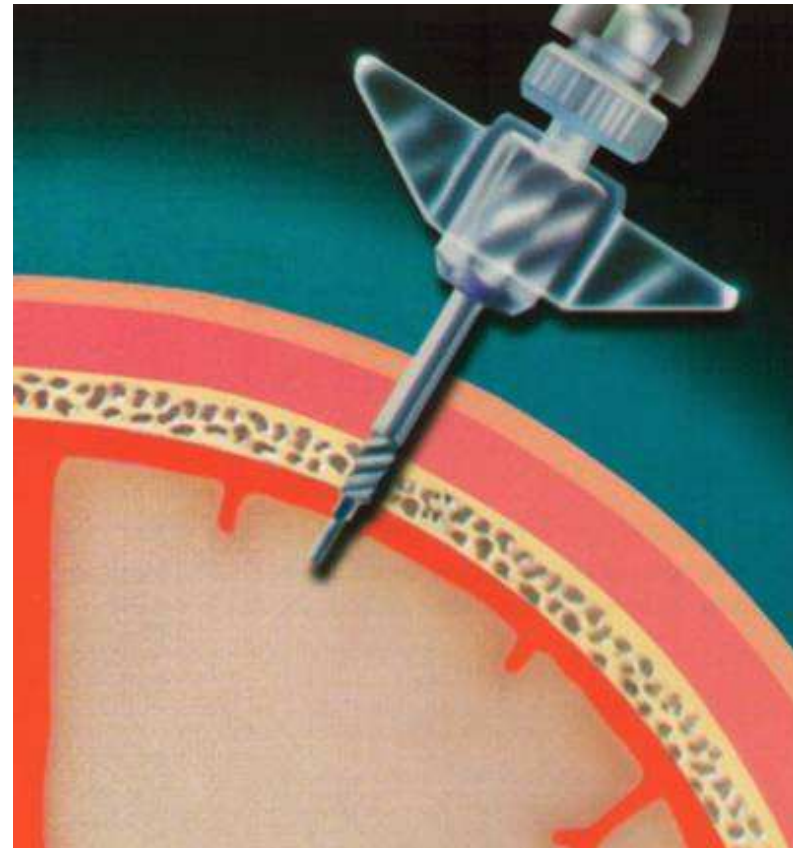


- Off the midline
- Frontal



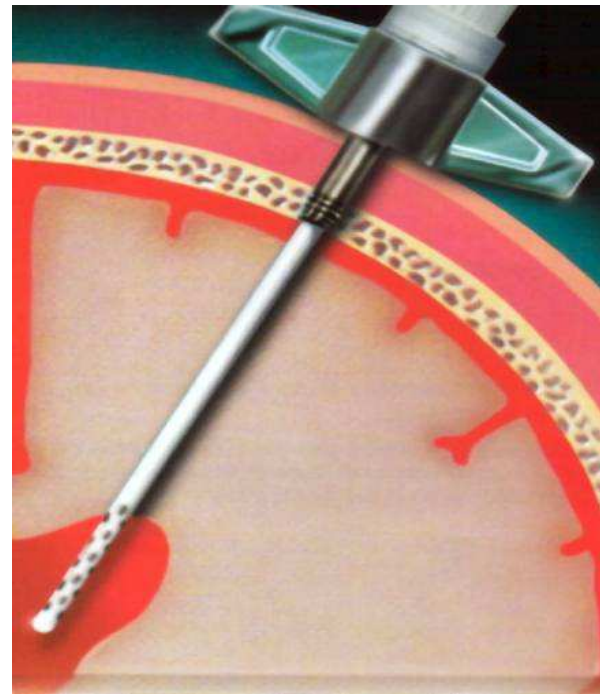
[Clinical Description]

- Parenchymal ICP catheter place about 1 cm. into the cortex
 - Tunneled
 - Bolted



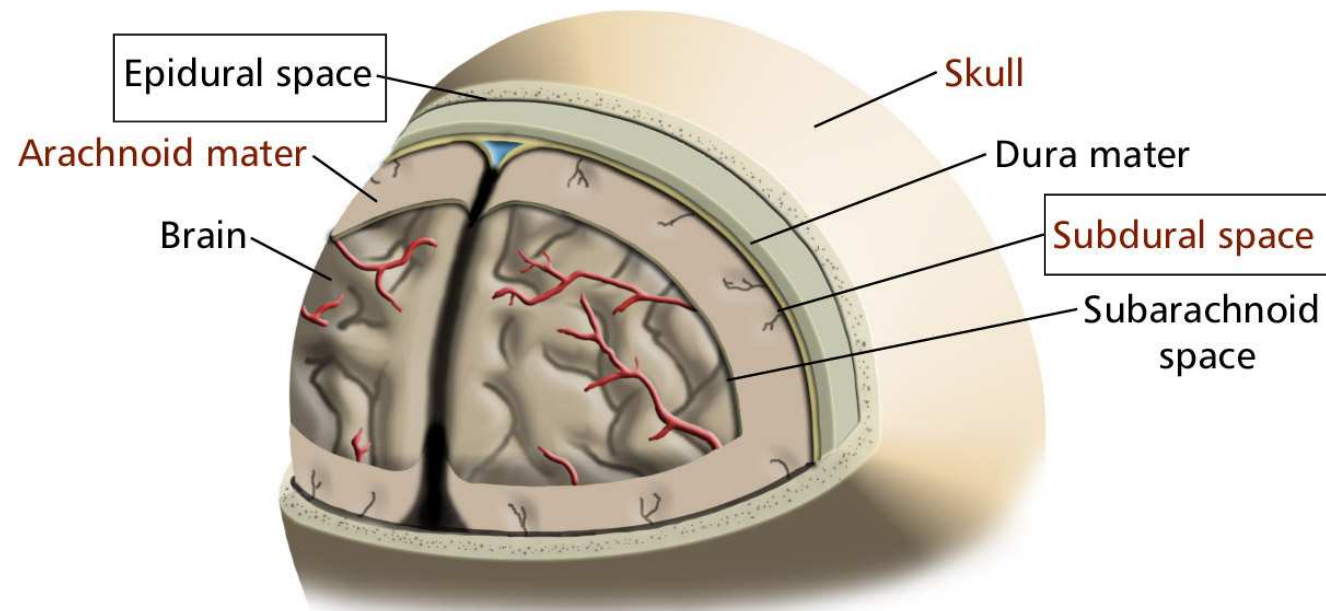
[Clinical Description]

- Ventricular ICP catheter
 - Frontal horn of the lateral ventricles
 - Tunneled
 - Bolted



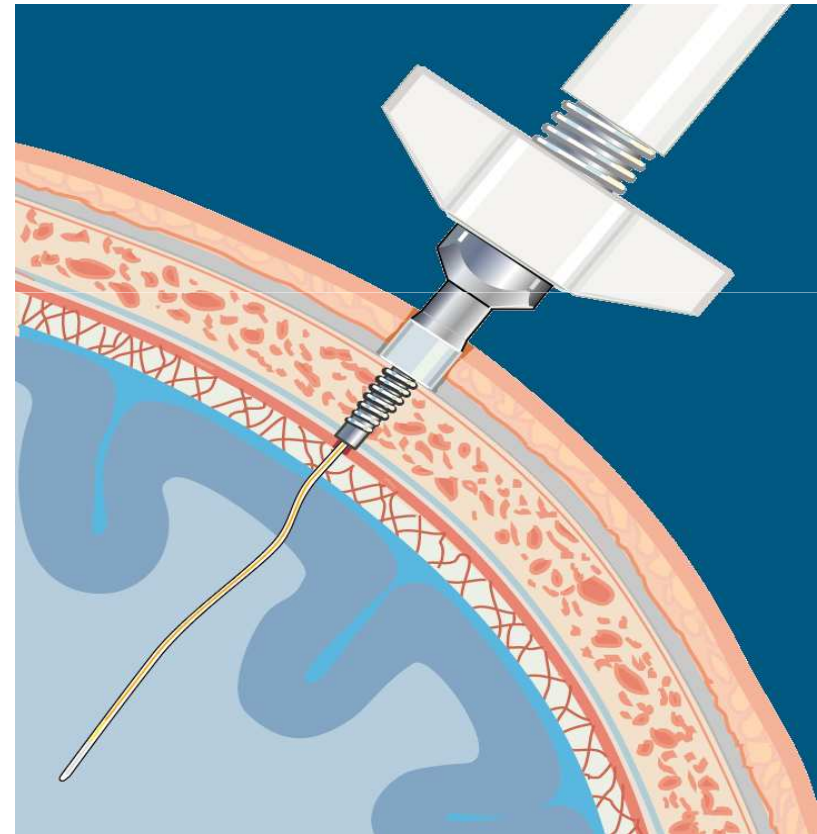
Clinical Description

- Extra-dural ICP catheter
 - Epidural
 - Subdural



[Clinical Description]

- Brain tissue oxygen
 - Monitored in white matter
 - Tunneled
 - Bolted

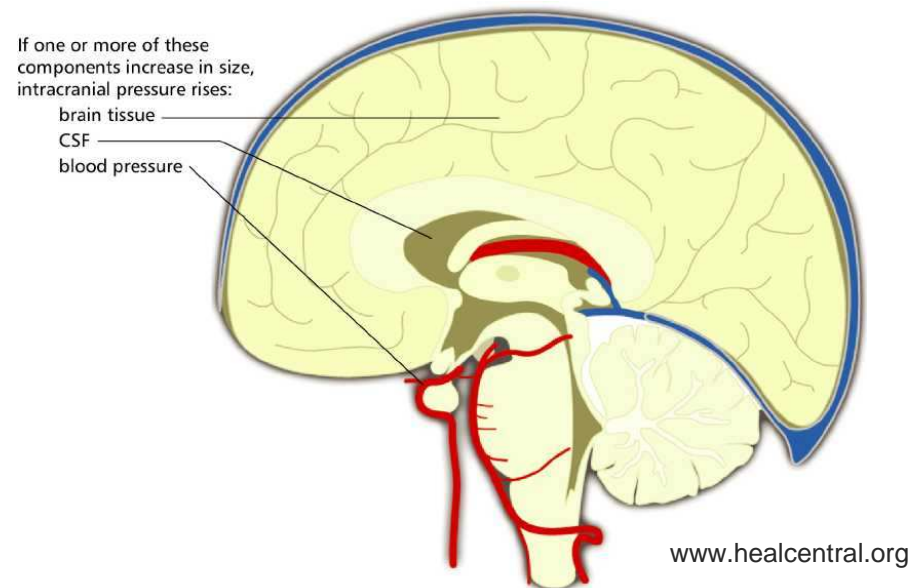


Clinical Description

■ Parameters

○ Intracranial pressure (ICP)

- Sum of the pressures exerted by intracranial contents



[Clinical Description]

- Parameters

- Cerebral perfusion pressure (CPP)

- Estimate of pressure needed to adequately perfuse the brain
 - $\text{Mean blood pressure} - \text{ICP} = \text{CPP}$

[Clinical Description]

- Parameters

- Brain tissue oxygen (PbtO₂)

- Measure of the amount of oxygen delivered to brain tissue (extravascular, extracellular)
 - Brain cells require oxygen to survive

[Clinical Description]

- Parameters

- Brain temperature

- Temperature of brain
 - Brain temperature is higher than body temperature
 - Fever worsens patient outcome

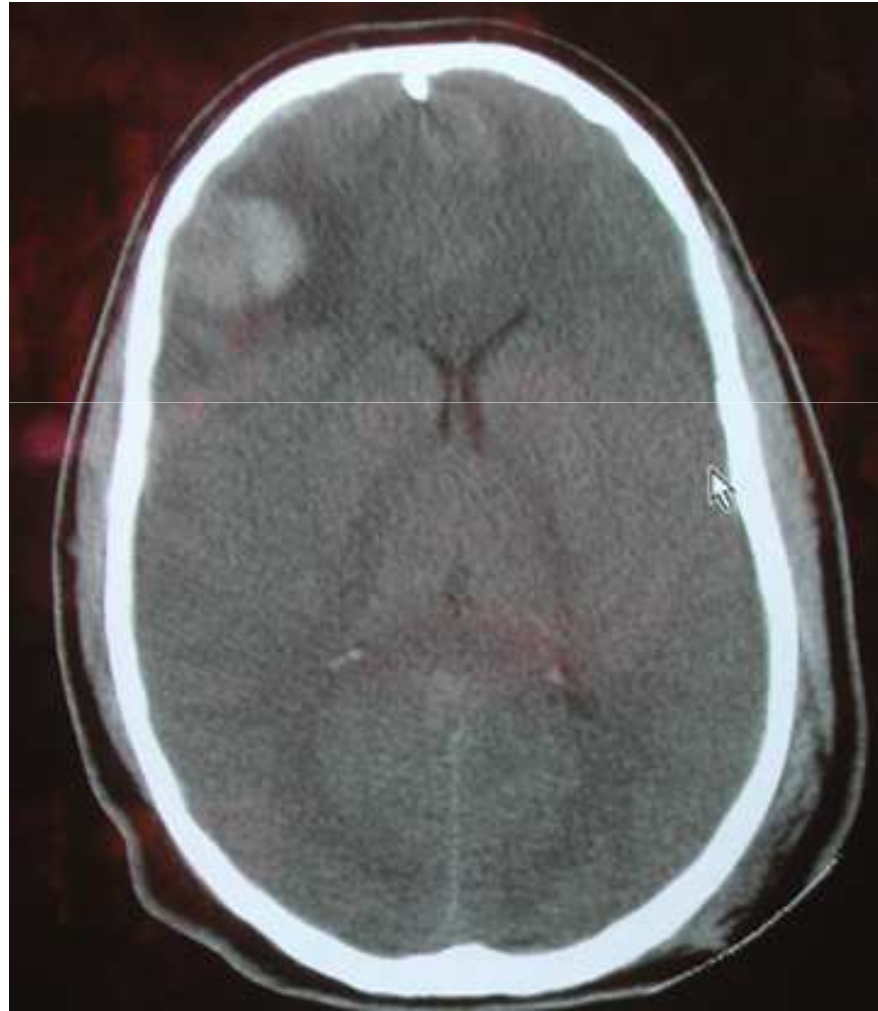
[Clinical Benefits]

- Impact on outcomes
 - Studies show patients treated with ICP directed care have better outcomes than those without (2001, 2002 [x3], 2004)
 - University of Pennsylvania (2005) found the addition of Brain Oxygen Monitoring significantly decreased mortality and morbidity

[CASE Study]

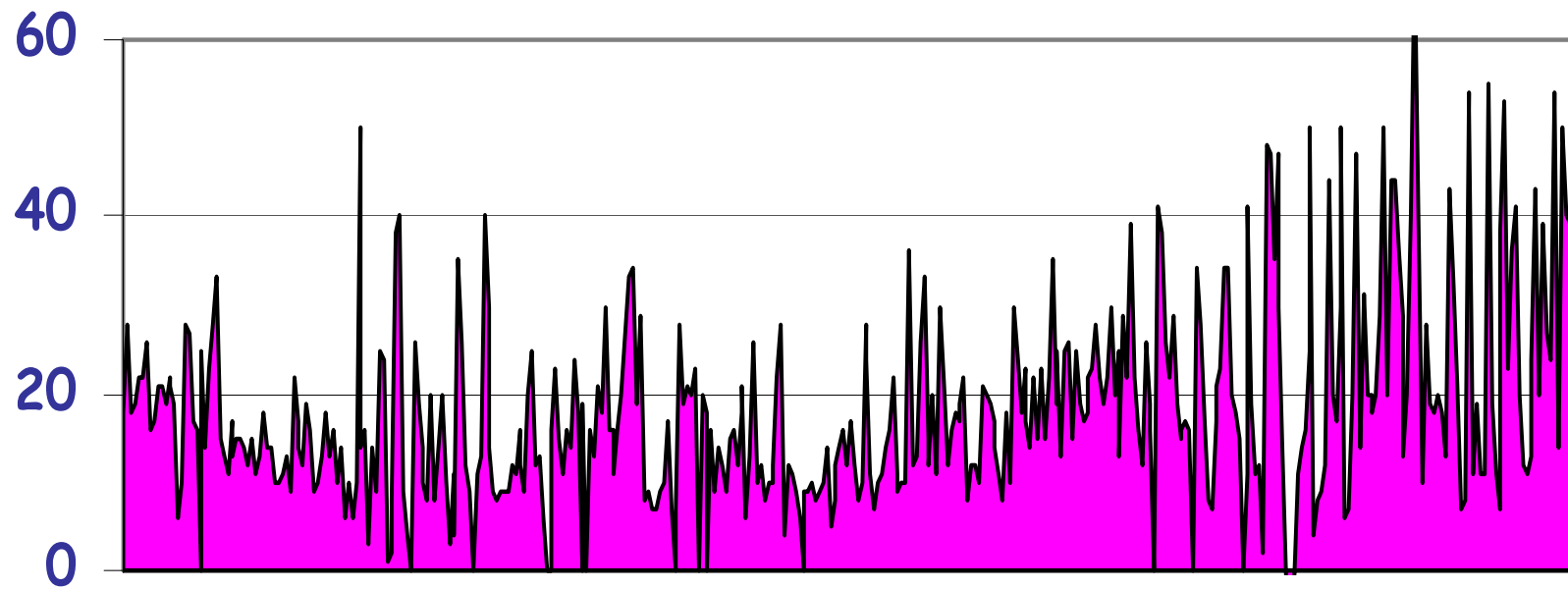
- 24 year old male
- ATV accident
- Left SDH & occipital fracture, basilar skull fracture, Right frontal contusion, SDH along Falx.
- Intractable elevations in ICP
- Evolving contusions
- Paralyzed, sedated, SjO_2 , LICOX

Pre-hemicraniectomy

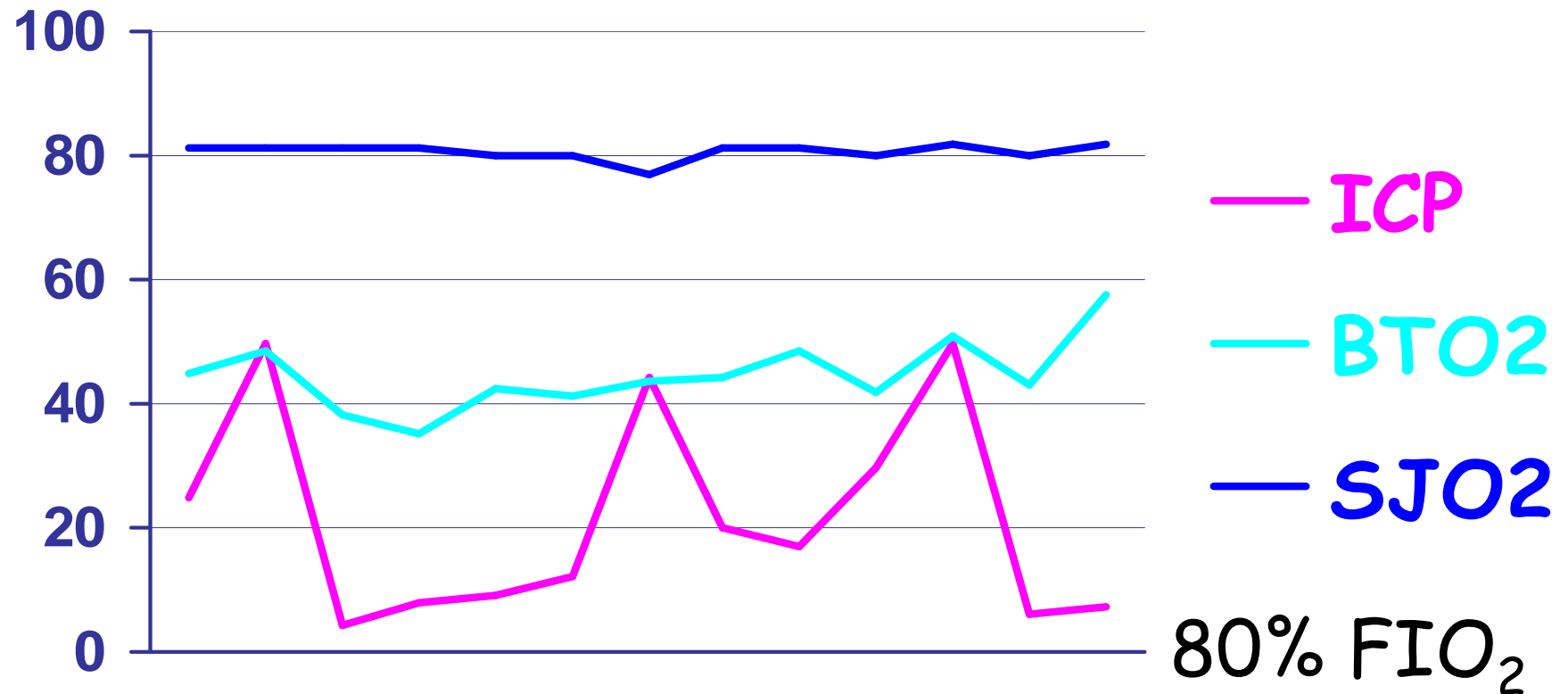


Hospital of the University of Pennsylvania. 2002

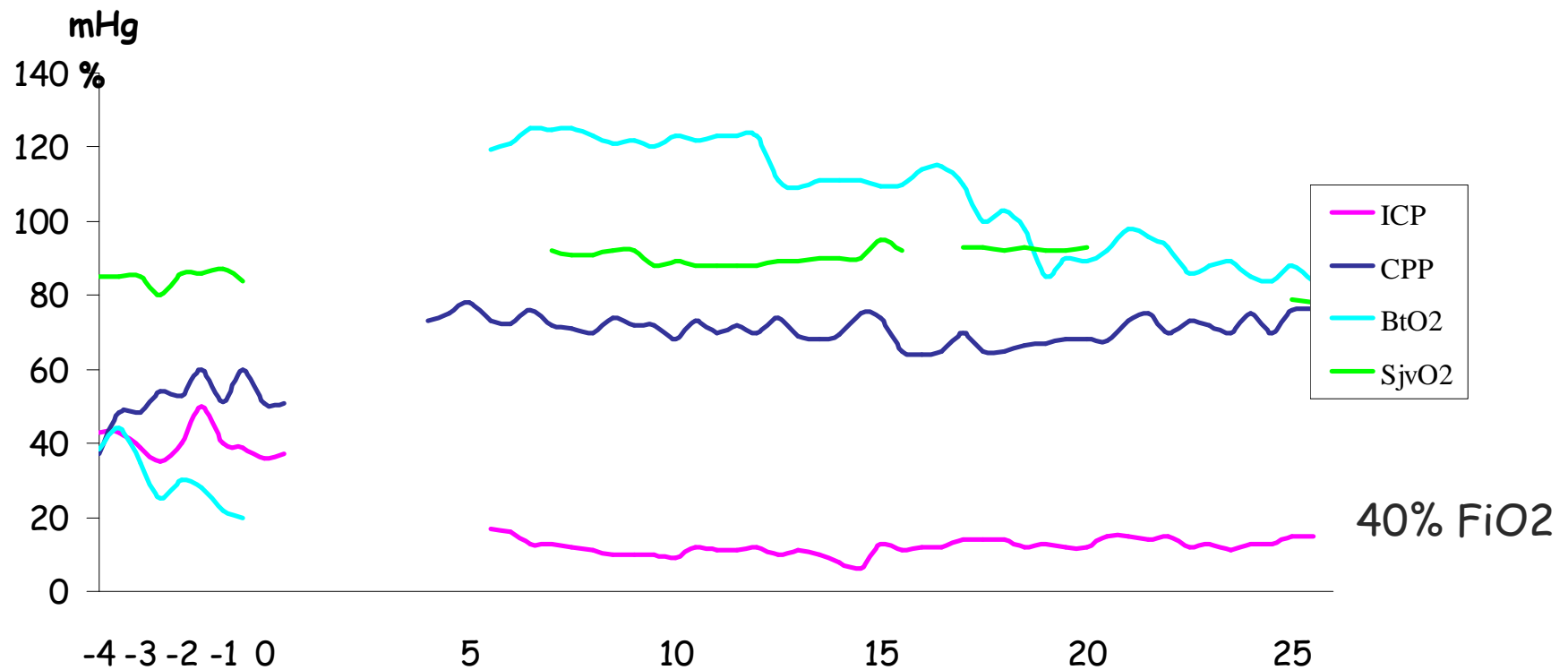
[ICP 7 Day Trend]



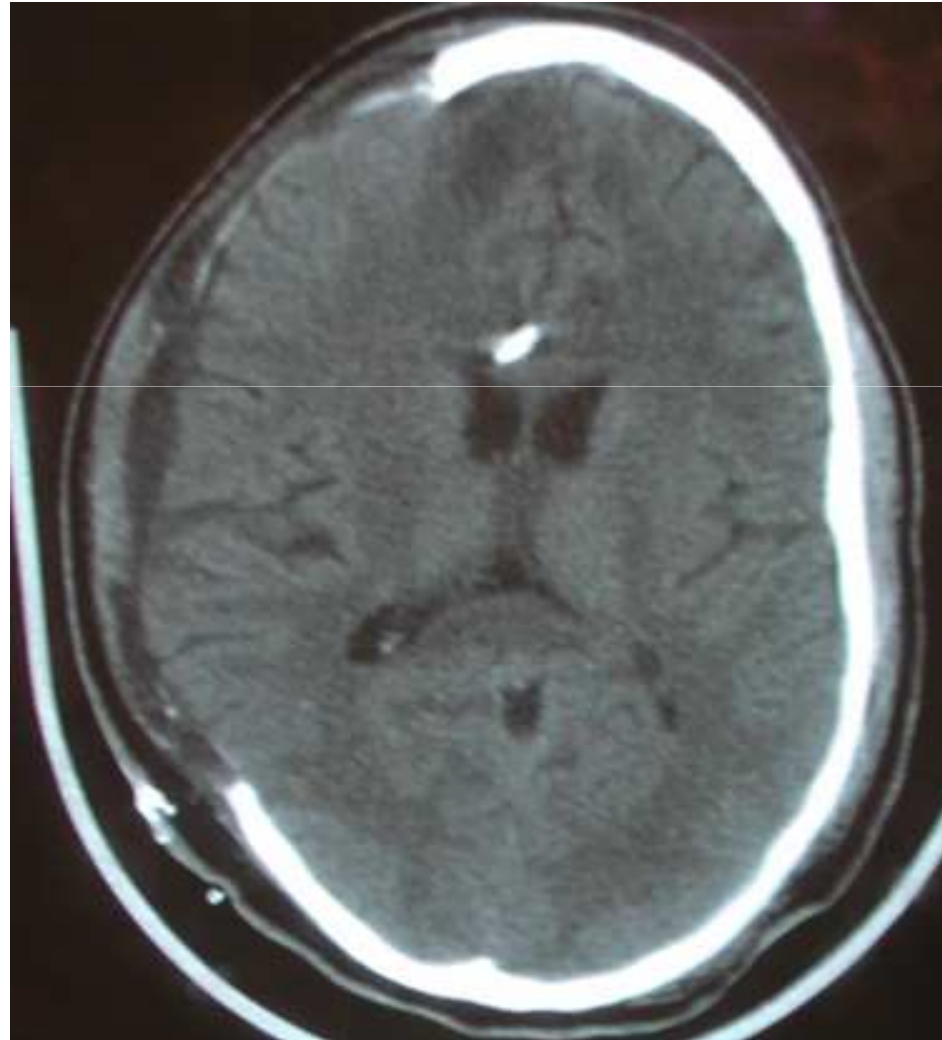
[Luxury Perfusion]



Pre- & Post-Decompressive Hemicraniectomy



Post-hemicraniectomy



Hospital of the University of Pennsylvania. 2002

[Case Study]

- At 3 month follow-up patient had returned to work without neurological deficit
- At 6 month follow-up patient was married & returned for replacement of bone flap
- At 12 month follow-up his family was expecting their first child



[Change in Coding]

- Support for change
 - Brain Trauma Foundation
- Necessary because of changes in clinical practice and need for research

[Change in Coding]

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[Change in Codes]

The Brain Trauma Foundation is willing to assist in the creation of appropriate coding education material in support of the new codes.

[Conclusion]

- Recommend expansion of the 02.2 category to capture specific catheter sites
- Identify a new category that could be expanded for the specific monitoring technologies
- Adoption of these new codes would lead to better data capture of current technologies, and assist in the research of these parameters toward improving patient outcomes